

**APPENDIX A**

**Affidavit of Philip of Philip C. Malte Under Rule 132**

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE  
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES**

Applicant: GARDNER, Conrad O.

Application No.: 08/896,514

Filing Date: June 23, 1997

Docket No.: 95-004M

Date:

For: EXTENDED RANGE MOTOR VEHICLE HAVING AMBIENT  
POLLUTANT PROCESSING

**AFFIDAVIT OF PHILIP C. MALTE UNDER RULE 132**

Philip C. Malte, being duly sworn, deposes and states:

1. Philip C. Malte is Professor of Mechanical Engineering at the University of Washington, Seattle, Washington. This position has been held since 1983. In The 10-year period to 1983, Philip C. Malte was Assistant Professor of Mechanical Engineering at Washington State University, Pullman, Washington, Associate Professor of Mechanical Engineering at Washington State University, and, Associate Professor of Mechanical Engineering at the University of Washington. Additional positions include Engineer (Martin Marietta Corporation), Senior Engineer (Rohr Industries), Senior Engineer and Chief Consulting Engineer (Energy International, Inc.), and U.S. Department of Energy (Faculty Rotator).
2. Philip C. Malte studied engineering at the University of Michigan, Ann Arbor, Michigan. The degrees received include PhD in 1971, Master of Science in 1966,

And Bachelor of Science in 1964.

3. Philip C. Malte has performed research and published in the field of Combustion since 1970. Focus of the research has been on the generation and control of pollutants in combustion systems, especially in gas turbine engines and piston engines.
4. Philip C. Malte has taught university courses on combustion engines and on combustion science and technology for approximately 25 years. The University of Washington course numbers are ME 481 and ME 424. Other courses taught deal with energy conversion.
5. Philip C. Malte has developed and maintained laboratories that support research and teaching on combustion and combustion engines. The Internal Combustion Laboratory at the University of Washington includes dynamometer test stands with engines, including a multi-cylinder gasoline engine, a single cylinder spark ignition engine, and two single-cylinder diesel engines.
6. Teaching on engines by Philip C. Malte has included traditional spark ignition and diesel engines, improvements in combustion for these engines, and alternatives to these engines. The latter topic includes hybrid-electric engines. Research on engines has dealt with combustion for land-based gas turbine engines and large-bore spark ignition engines, and alternative fuels for these engines.
7. Philip C. Malte is a member of the Society of Automotive Engineers (SAE) and Combustion Institute (CI), and a Fellow of a American Society of Mechanical Engineers (ASME).
8. Publication by Philip C. Malte has occurred in the journals and proceedings of the

ASME and CI. Additionally, SAE papers have been written.

9. Familiarity with hybrid-electric propulsion for automobiles has been gained by Philip C. Malte through teaching and study of the subject.
10. Philip C. Malte keeps abreast of the state of the art in combustion engines and related fields.
11. The new ground of rejection states that claims 55 and 59 are obvious to one of ordinary skill in the art over Lynch in view of nickel cadmium batteries

#### Nickel cadmium (Ni-Cd) batteries

##### Maintenance and operation issues:

- 1) Topping off with either demineralized or distilled water is required about once every 10 cycles- i.e. several times a week for normal automotive use. Water should be added 1 hour after batteries have reached full charge. Overfilling with water requires repair of batteries by manufacturer's authorized personnel.
- 2) Batteries would need to be cooled during charging to prevent damage from over heating.

##### Limited availability:

- 1) In 1990's only one manufacturer of Ni-Cd batteries of size appropriate for automotive propulsion. This is a foreign manufacturer (France).

##### Toxicity

- 1) Cadmium is a toxic metal and requires careful and cumbersome recovery and disposal or recycling/reprocessing. There were few qualified to do this.

#### Conclusion

Ni-Cd batteries are relatively old and developed technology with not a whole lot of potential for improvement- probably a dead technology. They have not caught on for automotive propulsion.

Clearly, they would not have been the choice of one of ordinary skill in the field of hybrid electric vehicles in the 1990's.

John F. Weale (1998). "Electric Propulsion for Tour Boats Operated on Crater Lake", Master of Science Thesis, Department of Mechanical Engineering, University of Washington, Seattle, Washington. (This is a public document available from the University of Washington Libraries.)

Dated: August 15, 2005  
Philip C. Malte  
Philip C. Malte

[illegible]

Sam C. Chen  
Notary Public

My Commission Expires: 5/30/2008